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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/670,255	09/26/2003	James W. Barnwell	87245.1640	4941

7590 06/17/2005

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EXAMINER

LEUNG, RICHARD L

ART UNIT	PAPER NUMBER
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3744

DATE MAILED: 06/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/670,255	Applicant(s) BARNWELL, JAMES W.	
	Examiner Richard L. Leung	Art Unit 3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 102

2. Claims 1-3, 6, 8-12, 15, 17-21, 24, 26, and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by US 5228504 (Mantegazza et al.). Mantegazza et al. disclose a system and method for drying compressed air (column 1, lines 17-40) comprising providing a refrigerant system having a compressor I, condenser L, etc, as is already well known in the art, and a heat exchanger means comprising a phase change material (thermal mass) G that comprises water that changes from solid to liquid and from liquid to solid, wherein the phase change material G is configured to extract heat from the air and reduce cycling of the refrigerant system. See particularly Fig. 3 and description in column 3, lines 7-31. The heat exchanger further comprises an air-to-air exchanger and an air-to-refrigerant exchanger through fins H, and the air-to-refrigerant exchanger comprises the phase change material G, as best understood. The system additionally has a condensate separator E.

Claim Rejections - 35 USC § 103

3. Claims 4, 5, 13, 14, 22, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5228504 (Mantegazza et al.) in view of US 6085529 (Galus et al.). As discussed above, Mantegazza et al. disclose all the limitations of the claims except for having the condensate separator further comprise a wire mesh, particularly a wire mesh comprising stainless steel, copper, or plastic. Galus et al. teach an air drying

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system comprising a heat exchanger having an air-to-air heat exchanger 12' and an air-to-refrigerant heat exchanger 14', and further comprising a stainless steel wire mesh 340 used to provide removal of moisture droplets suspended in the air flow. See Fig. 11 and column 17, lines 7-14. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have provided the condensate separator in the system disclosed by Mantegazza et al. with a stainless steel mesh as taught by Galus et al. in order to demist the air and remove any suspended moisture entrained in the air.

4. Claims 7, 16, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5228504 (Mantegazza et al.) in view of US 6393861 B1 (Levenduski et al.). As discussed above, Mantegazza et al. disclose all the limitations of the claims except for using organic paraffin as the phase change material. The use of paraffin as a phase change material is old and known in the art, an example of which is demonstrated by Levenduski et al. Levenduski et al. teach a system wherein a refrigeration system is provided with a thermal storage unit 132 having a phase change thermal storage material, and Levenduski et al. further teach that a suitable thermal storage material is organic paraffin. See particularly column 5, lines 55-63. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used organic paraffin as taught by Levenduski et al. as the phase change material in the system disclosed by Mantegazza et al. because such a material has a relatively low cost, is widely available, and is commonly used in the art for thermal storage applications.

Response to Arguments

5. Applicant's arguments, filed 28 March 2005, with respect to the rejections of claims 4, 5, 13, 14, 22, and 23 under 35 U.S.C. 112, second paragraph, have been fully considered and are persuasive in view of the amendment to the claims that fix the incorrect dependencies. These rejections have been withdrawn.

6. Applicant's arguments with respect to the rejections of claims 1-3, 6, 8-12, 15, 17-21, 24, 26, and 27 under 35 U.S.C. 102(b) and of claims 4, 5, 7, 13, 14, 16, 22, 23, and 25 under 35 U.S.C. 103(a), however, have been fully considered but they are not persuasive.

Applicant asserts that Mantegazza et al. fail to disclose the claimed phase change material and therefore fails to anticipate independent claims 1, 10 and 19. As discussed in the rejections, Mantegazza et al. disclose the use of a thermal mass G that comprises water that freezes and melts, and Applicant does not appear to dispute this (Remarks, page 7, lines 2-3). Since the water changes between liquid and solid, the Examiner considers thermal mass G to be equivalent to the claimed "phase change material." Particular attention is drawn to column 2, lines 53-57 in which Mantegazza et al. disclose that by freezing the water, heat transfer efficiency increases because of the latent heat of fusion. In other words, Mantegazza et al. expressly use the phase change behavior of water to increase heat transfer. Accordingly the Examiner does not find Applicant's assertion that the thermal mass of Mantegazza et al. is not a phase change material to be persuasive.

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Applicant has also amended independent claims 1, 10, and 19 such that the phase change material is configured/used to extract heat from the air and reduce cycling of the refrigerant system, and asserts that Mantegazza et al. fail to meet this new limitation. The Examiner respectfully disagrees. Attention is drawn to column 3, lines 26-30 which states:

"The mass of moist material which ices [i.e. the phase change material] has a function of storing energy to transfer it to the first fluid [compressed air] to be cooled when the refrigerant fluid circuit [refrigerant system] is not circulating thereby reducing the amount of time the compressor (I) of the refrigerant circuit is operated."

Attention is also drawn to column 3, lines 2-6 which states:

"The presence of ice in the mass placed between the fins increases the thermal efficiency and lowers the average operating temperature of the system thereby prolonging the time in which the compressor of the refrigerant system is in an 'off' mode."

Therefore it is understood that the phase change material of Mantegazza et al. is expressly used for extracting heat from the air and reducing the cycling of the refrigerant system. Accordingly the Examiner does not find Applicant's amendments to the claims to be sufficient in overcoming the rejections.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

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shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard L. Leung whose telephone number is 571-272-4811. The examiner can normally be reached on Mon-Fri.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl J. Tyler can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Richard L. Leung
Examiner
Art Unit 3744


CHERYL TYLER
SUPERVISORY PATENT EXAMINER

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